logical elastomers, magnetorheological fluids, magnetorheological elastomers, dielectric elastomers, ionic polymer metal composites, piezoelectric polymers, piezoelectric ceramics, various combinations of the foregoing materials; and

a controller in operative communication with the active material adapted to selectively provide the activation signal.

2. The active material based seal assembly of claim 1, wherein the active material has one end attached to a rigid member.

3. The active material based seal assembly of claim 2, wherein the seal structure further comprises a passive elastic member in operative communication with the active material, wherein the passive elastic member is positioned to sealingly contact an opposing surface in response to the activation signal to the active material.

4. The active material based seal assembly of claim 2, wherein the seal structure further comprises a passive elastic member in operative communication with the active material, wherein the passive elastic member is positioned to sealingly contact an opposing surface upon discontinuation of the activation signal to the active material.

5. The active material based seal assembly of claim 1, wherein the seal structure comprises a passive elastic member on a bistable structure formed of the active material, wherein the bistable structure is disposed over a recessed portion of a surface, wherein the bistable structure is curvilinear with respect to the recessed portion upon discontinuation of the activation signal and substantially linear upon activation of the activation signal to sealingly force the passive elastic member against an opposing surface.

6. The active material based seal assembly of claim 1, wherein the seal structure comprises a first layer of the active material and a second layer of a passive elastic material.

7. The active material based seal assembly of claim 6, wherein the seal structure further comprises an encapsulating layer about the first and second layers.

8. The active material based seal assembly of claim 1, wherein the seal structure comprises a tubular shaped body and the active material is in operative communication therewith, wherein the active material dimensionally expands the tubular shaped body in response to the activation signal.

9. The active material based seal assembly of claim 1, wherein the active material forms all of the seal structure.

10. The active material based seal assembly of claim 9, wherein the active material is interiorly disposed within the tubular elastic body and comprises an electroactive polymer gel in fluid communication with a fluid reservoir.

11. The active material based seal assembly of claim 9, wherein the tubular elastic body is pressurized and the active material is a dielectric elastomer in fluid communication with a fluid reservoir.

12. The active material based seal assembly of claim 9, wherein the active material is a bimorph actuator disposed on an inner surface of the tubular seal body (**114**).

13. A vehicle comprising:

at least two opposing surfaces; and

an active material based seal assembly intermediate the at least two opposing surfaces, wherein the active material based seal assembly comprises a seal structure comprising an active material adapted to change at least one attribute in response to an activation signal, wherein the change in the at least one attribute changes a modulus property and/or shape of the seal structure, and a controller in operative communication with the active material adapted to selectively provide the activation signal, wherein the change in the at least one attribute changes a dimension of the seal structure.

14. The vehicle of claim 13, wherein the seal structure is spaced apart from a selected one of the at least two opposing surfaces and is adapted to contact the selected one to form a sealing engagement in response to the activation signal.

15. The vehicle of claim 13, wherein the active material comprises shape memory alloys, shape memory polymers, electroactive polymers, ferromagnetic shape memory alloys, magnetic materials, electrorheological fluids, electrorheological elastomers, magnetorheological fluids, magnetorheological elastomers, dielectric elastomers, ionic polymer metal composites, piezoelectric polymers, piezoelectric ceramics, various combinations of the foregoing materials.

16. The vehicle of claim 13, wherein the seal structure contacts the at least two opposing surfaces to form a sealing engagement in the absence of the activation signal and is adapted to contract away from a selected one of the at least two opposing surfaces in response to the activation signal.

17. The vehicle of claim 13, wherein the seal structure and the at least two opposing surfaces defines a seal between a door and doorframe.

18. The vehicle of claim 13, wherein the seal structure is tubular shaped and the active material is in operative communication with the seal structure, wherein the change in the at least one attribute to the active material changes a modulus property and/or shape of the seal structure.

19. The vehicle of claim 13, wherein the active material is intermediate is a passive elastic member and a selected one of the at least two opposing surfaces, wherein activation of the active material causes the passive elastic member to increase a seal, force of the active material based seal assembly against the at least two opposing surfaces.

20. The vehicle of claim 19, wherein the passive elastic member is tubular shaped and the active material is disposed within an interior thereof, wherein the change in the least one attribute changes the modulus and/or shape of the seal assembly.

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